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ABSTRACT

A concern with the motivational behavior for keeping up-to-date, a learning process, is presented. The half-life of a professional's competence is described as the time after completion of professional training when, because of new developments, practicing professionals have become roughly half as competent as they were upon graduation to meet the dmnds of their profession. A questionnaire was developed that would enable practicing resource managers and scientists to supply as much information as possible on their updating needs. On the basis of 5,600 responses, five determiners of adult motivation were ranked by the natural resource managers in the following order: personal ambition and goals, on-the-job problem solving, organizational climate, discussion with colleagues, and supervisor. One of the principal recommendations emerging from the study is that managers should be spending one day a week or the equivalent in regularly scheduled study or training. (Author/CK)

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Motivational Determinants for Adult Learning

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The emphasis of this paper is concerned with the motivational behavior for keeping up-to-date, a learning process. During the working years of a professional man or woman — roughly between the ages of 30 and 65 — a critical issue is whether or not a high level of competence and creative productivity can be maintained against the eroding effects of time. A highly trained person must constantly renew his knowledge. The goal is not merely to keep knowledge already acquired during the period of formal education. Much more than this — for past knowledge may become outdated — the aim is constantly to recharge the batteries which motivate and trigger self-renewal by keeping abreast of new knowledge that is constantly being added by research and publication.

The decline of competence in professional persons which often accompanies the passing of years is not inevitable or necessary except in the presence of ill health or other extreme debilitating factors. Obsolescence is a normal though decremental process that nevertheless responds favorably to updating efforts. What is needed for adults is a new image of education — life-long education in which the learning process is continuous and unbroken. In familiar terms, this is continuing education but with a new and dynamic meaning.

To provide a background for a discussion of adult learning, the notion of the half-life of a professional will be introduced.

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The Half-Life of a Professional

A useful measure for estimating the extent of obsolescence in various professions is the concept of half-life, a term taken from nuclear physics. Obsolescence is a decremental process comprising the loss of acquired knowledge and non-acquisition of new learning which occurs unless effort is constantly made to repair the erosion of knowledge and to stimulate growth and innovation. The half-life of a professional's competence can be described as the time after completion of professional training when, because of new developments, practicing professionals have become roughly half as competent as they were upon graduation to meet the demands of their profession. Dr. Edward C. Rosenow, Jr. (1971), Vice-President of the American College of Physicians, recently estimated the half-life of medical knowledge to be five years. Professor J. Lukasiewicz (1971), of Carleton University in Ottawa, has stated that while the half-life of a 1940 engineering graduate was twelve years, it has shrunk to five years for today's graduate.

The factor which figues most prominently in hastening obsolescence is the rate of change in the discovery and application of new knowledge. Professional people, well-trained in their specialties, are finding their knowledge and methods out of date after only 5 to 10 years on the job. Not only does one have to keep abreast of his own area but what is going on in related fields.

In order to keep abreast of new publications, according to George and Dubin (1972), 20% of a professional's working time should be devoted to updating. Chapanis (1971) estimated that a compulsive, well-versed engineering psychologist would have to read 30 or 40 articles, books, theses, and technical reports every day of the year merely to keep abreast of the current literature. If the psychologist has difficulty in keeping up within

his field, consider the lot of the biologist or the physical scientist in which new information is added to the field in vastly greater amounts. For instance, the number of entries in Biological Abstracts (1970) rose from 40,000 in 1957 to about 110,000 in 1967, and Chemical Abstracts published about 244,000 in 1967.

A MODEL FOR ADULT LEARNING

Clearly, the process of adult learning requires radical changes in educational thinking, not the least of which is the recognition that lifelong education for updating must become an integrated part of professional practice. The traditional concept of education which is essentially terminal education--that is, the completion of a formal program in a prescribed number of years as adequate preparation for a lifetime of work--must give way to a concept of lifelong education as a requisite ingredient in a professional career. The half-life of the practicing professional can rarely be extended by a casual attempt on the part of the individual to keep up with new developments; the constant process of rejuvenation requires a systematic approach.

Motivation for Professional Updating

One of the critical psychological issues in adult learning is motivation. An adult must be highly motivated in order to maintain competence throughout his career. An effort in this direction has been made by Dubin (1972) and Dubin and Cohen (1970). Their model described the motivation to update as a multi-dimensional process comprising psychological and environmental variables.

A principal determinant of motivation is achievement motivation. By definition, achievement refers to competition with a standard of excellence. Persons who are highly motivated are generally attracted to activities

which require skill and excellence in performance. Porter (1971) has advanced a theoretical approach for understanding motivation in professional updating by the use of expectancy theory. How the professional evaluates different kinds of potential rewards is significant. Rewards can be intrinsic, a feeling of accomplishment, self-fulfillment, or extrinsic, a pay increase, promotion, favorable evaluation, etc. An organization can influence the employee's expectations by its actions of rewarding for keeping abreast of current knowledge. The employee's expectations are influenced by his observations on whether those who keep up are rewarded or not rewarded. This involves a matter of trust — will the organization reward him for pursuing professional updating.

McClelland and Winters (1969) summarized the behavioral characteristics of achievement-oriented managers. They found that high levels of achievement motivation are associated with entreprenurial behavior, innovative risk-taking, and business success. The following are characteristics of a person who shows a high degree of need achievement: 1) seek and assume a high degree of personal responsibility: 2) take moderate or calculated risks; 3) set challenging but realistic goals for himself; 4) develop comprehensive plans to help attain his goals; 5) show preference for problem situations which provide feedback of his performance; 6) seek out business opportunities where his desire to achieve will not be thwarted; 7) spend time thinking about how to get things done better and take pride in accomplishment; 8) show more initiative and exploratory behavior by continually researching the environment to find tasks he can solve to his satisfaction.

Achievement motivation can be developed in persons as well as built into jobs. It is one way of maximizing the unused potential of subordinates.

Organizational Climate

A key environmental factor of adult learning is organizational climate. Organizational climate can be defined as organizational and management practices that arouse motivation, condition attitudes and shape behavior on the part of its members (1971). A high organizational climate (1971) emphasizes the following characteristics: achievement - a desire on the part of people in the organization to do a good job and contribute to the performance of the company; concern for excellence - degree to which the group is concerned with improving individual performance, being flexible, innovative and competent; emphasis on problem solving - extent to which group anticipates and solves problems related to group functioning; high reputation for work performance - reflects status and reputation of individual's work group as compared to other work groups; provides appropriate training for individuals - degree to which organization provides appropriate training for individuals; provides supportive and friendly atmosphere - degree to which supervisors generate a supportive and friendly atmosphere; initial job orientation - individuals are informed on what to expect when they first start on the job.

A number of additional factors will be described which influence high organizational climate. These are 1) supervisory behavior that encourages professional growth of subordinates; 2) challenging work projects that promote on-the-job problem solving; 3) peer and group interaction that allow for interchange and seeking of information; and 4) an organizational policy that rewards learning.

Method

A national sample of 5,600 natural resource managers and scientists was obtained from the National Science Foundation. These included personnel

in forestry, wildlife and fisheries, range management, soil and water conservation, and recreation and parks.

Development of the Questionnaire

A questionnaire was developed that would enable practicing resource managers and scientists to supply as much information as possible on their updating needs. In addition to providing data on their professional characteristics, education, primary responsibilities, employment, etc., they were asked to give information regarding their attitudes toward the need for updating, the factors that motivate them to keep abreast of new developments, the methods they use and the methods they would prefer for keeping up-to-date, and the attitudes and practices of their organizations in this respect. They were provided with a list of 56 specific areas of knowledge and asked to indicate the degree of their personal needs in each area, as well as to indicate whether they felt such knowledge was needed by their subordinates and by their immediate supervisors. The list was based on a review of current literature in the field of natural resources, on discussions with university, state, federal, and industrial personnel, and on the results of previous studies made by the Penn State Department of Planning Studies in other professional areas. In addition, each respondent was given the opportunity to write-in the specific courses he would like to include in a personal self-development program. Finally, he was asked to comment on the general importance of updating in the field of natural resources.

The questionnaire was pretested on small groups of Pennsylvania forestry, fisheries, and wildlife specialists. Copies were sent for comment to professional societies and to appropriate federal agencies, including their regional offices. The questionnaire was submitted for final review to the national advisory committee.

Results

We have earlier described the adult learning model with its five components. A questionnaire item was written to assess the strength of each of the five components. The item read: "Rank the five items below (1 highest, 2 next highest, etc.) in the order that they stimulate you to keep abreast of professional activities in your organization." The items were: your own personal motivation (ambition, goals), your supervisor, on the job problem solving by getting involved in interesting projects or challenging assignments, discussion with colleagues in organization and an organizational climate which encourages communication, interaction and discussion between persons.

On the basis of 5,600 responses, five determiners of adult motivation were ranked by the natural resource managers in the following order:

personal ambition and goals	57%
on-the-job problem solving	34
organizational climate	6
discussion with colleagues	5
supervisor	1

Personal ambition and on-the-job problem solving were ranked highest as motivation for updating by almost 90% of the natural resource managers and scientists. The poor showing of the role of the supervisor indicated that he played an almost non-existent role in the professional development of his subordinates.

One of the principal recommendations emerging from the study is that managers should be spending one day a week or the equivalent in regularly scheduled study or training.

The constant change and explosive growth of knowledge have made continuing education or learning a recognized part of all professional life. Our results have identified the kinds of motivation which supervisors should recognize as those which stimulate the natural resource manager to maintain his professional competence.

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